FLUXON INJECTION INTO ANNULAR JOSEPHSON JUNCTIONS

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ABSTRACT

A method and apparatus for inserting fluxons into an annular Josephson junction is disclosed. Fluxon injection according to the present invention is based on local current injection into one of the superconducting electrodes of the junction. By choosing an appropriate value for the injection current, which depends upon the spacing between injecting leads among other factors, the residual fluxon pinning can be reduced to a very small level. Fluxon injection according to the present invention provides for fully controlling the trapping of individual fluxons in annular Josephson junctions and is reversible to a state of zero fluxons without heating the Josephson above its critical temperature. Fluxon injection according to the present invention can be used for preparing the working state of fluxon oscillators, clock references, radiation detectors, and shaped junctions that may be used as qubits for quantum computing.